# ECE 375 PRELAB FOR LAB 3

Introduction to AVR Simulation with Atmel Studio

**Lab Time: Friday 4 - 6**

*Faaiq Waqar*

## PreLab Questions

To complete this prelab, you may find it useful to look in the AVR Starter Guide. If you consult any online sources to help answer the questions below, you must list these sources as references in your prelab

*1) What are some differences between the debugging mode and run mode of the AVR simulator? What do you think are some benefits of each mode?*

Debugging mode allows or line by line simulation, where as run mode continuously runs the program. Debugging mode is especially useful for line by line debugging, which allows whoever is testing the program to take control of the simulation. One can verify data in the registers and memory. Debugging mode also allows the use of break points, so basically, use this mode if you would like to debug your program. Running can be the more practical choice if you are simply just doing a full runthrough of the execution of the program for verification or demonstration purposes.

*2) What are breakpoints, and why are they useful when you are simulating your code?*

A breakpoint that is set in code will automatically halt the simulation of your program and then run it afterwards in the line by line mode. This is useful for the line by line testing strategy that I discussed before, but primarily is important when the programmer needs to observe the step by step execution of the program, whether that be for QA and debugging or simply for demonstration purposes.

*3) Explain what the I/O View and Processor windows are used for. Can you provide input to the simulation via these windows?*

The IO view and the Processor windows are used to provide a look at the current state of the microcontroller during its course of simulation. While the IO view tab contains the config. of registers associated with the simulated chip, The processor tab instead displays the current contents of the program counter, stack pointer and X,Y and Z registers. These windows are used for the sake of observation, and are not used with input

*4) The ATmega128 microcontroller features three different types of memory: data memory, program memory, and EEPROM. Which of these memory types can you access by using the Memory window of the simulator?*

a. *Data memory only*
b. *Program memory only*
c. *Data and program memory*
d. *EEProm only*
e. *All three types*

The answer is e, as stated by the book, no good simulator would leave any of this out, and Atmel Studio here is no exception. This can all be viewed through the use of the memory window, which shows the data of the memory in hexadecimal format, this is for program memory too.